Answer on Question 82171, Physics, Optics

Question:

The critical angle for total internal reflection at an air-water interface is approximately $48°$. In which of the following situations will total internal reflection occur?

a) light incident in water at $40°$

b) light incident in water at $55°$

c) light incident in air at $40°$

d) light incident in air at $55°$

Solution:

The total internal reflection occurs when light attempts to move from a medium having a given refractive index to a medium having a lover refractive index (in our case from water with $n_1 = 1.33$ to air with $n_2 = 1.0$).
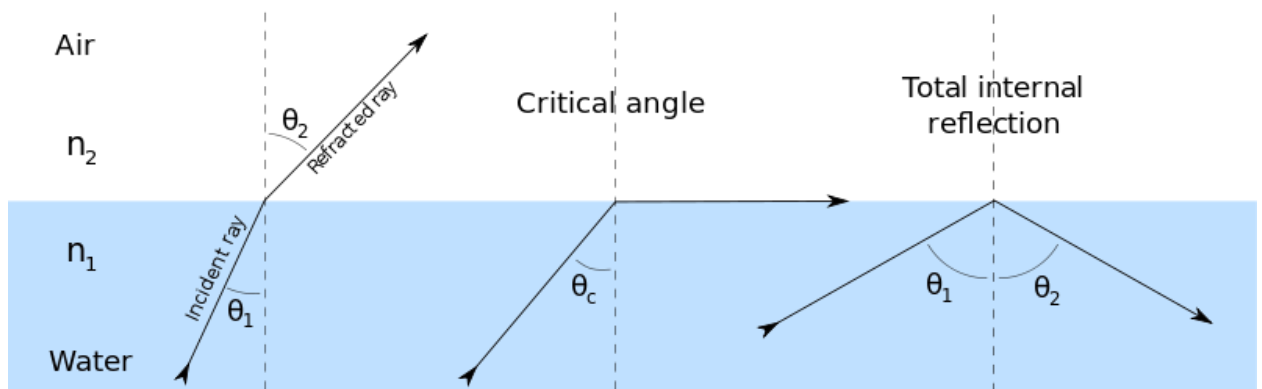
As we can see in the picture for $\theta_1 > \theta_c$ there is no reflected ray. Thus, in order to occur the total internal reflection we need b) light incident in water at $55°$.

Answer:

b) light incident in water at $55°$.